MP2 Long Term #2

1) Members of the East High School football team have decided to hold a one-day car wash to raise money for trophies and helmet decals. They plan to charge $7.50 per car, but they need to pay $55 for water and cleaning supplies. Write a rule that shows how car wash profit is related to the number of car wash customers. [2 pts]

2) Juan and Tiffany work for their town's park department cutting grass in the summer. They can usually cut an acre of grass in about 2 hours. They have to allow 30 minutes for round-trip travel time from the department equipment shop to a job and back. What rule tells the time required by any job as a function of the number of acres of grass to be cut on that job?   [2 pts]

3) When a summer thunder-and-lightning storm is within several miles of your home, you will see the lightning and then hear the thunder produced by that lightning. The lightning travels 300,000 kilometers per second, but the sound of the thunder travels only 330 meters per second. That means that the lightning arrives almost instantly, while the thunder takes measurable time to travel from where the lightning strikes to where you are when you hear it.

You can estimate your distance from a storm center by counting the seconds between seeing the lightning and hearing the thunder. What formula calculates your <u>distance from the lightning strike</u> as a function of the time gap between lightning and thunder arrival?   [2 pts]

4) Rush Computer Repair makes service calls to solve computer problems. They charge $40 for technician travel to the work site and $55 per hour for the time spent working on the problem itself. What symbolic rule shows how the cost of a computer repair depends on actual time required to solve the problem?   [2 pts]

5) The freshman class officers at East High School ordered 1,200 fruit bars to sell as a fund-raising project. They paid $0.30 per bar at the time the order was placed. They plan to sell the fruit bars at school games and concerts for $0.75 apiece. No returns of unsold bars are possible. What rule shows how project profit depends on the number of bars sold? [2 pts]

6) Janitorial assistants at Eastview Mall start out earning $6 per hour. However, the $75 cost of uniforms is deducted from the pay that they earn.

a. Explain how the rule $E = 6.00h - 75$ shows how a new employee's earnings depend on the number of hours worked. [2 pts]

b. How many hours will a new employee have to work before receiving a paycheck for some positive amount? [2 pts]
Show your work or Explain your thinking.

c. How many hours will a new employee have to work to earn pay of $100 before taxes and other withholdings? [2 pts]
Show your work.

d. Sketch a graph of the rule relating pay earned to hours worked, and label points with coordinates that provide answers to Parts b and c. [4 pts]

7) Experiments with a bungee jump suggested the rule $L = 30 + 0.2w$ relating stretched cord length (in feet) to weight of the jumper (in pounds).

    a. What will be the stretched cord length for a jumper weighing 140 pounds?
        Show your work.   [2 pts]

    b. What jumper weight<u>s</u> will stretch the cord to a length of at most 65 feet?
        Show your work.   [2 pts]

    c. Sketch a graph of the cord length relationship and label points with coordinates that give answers to parts a and b.   [4 pts]

    d. Study entries in a table of (w, L) values for $w = 0$ to $w = 300$ in steps of 10. What do the values 30 and 0.2 tell you about the bungee jump experience?
        Explain your thinking.   [2 pts]

8) When promoters of a special Waka Flocka concert did some market research, they came up with a rule $N = 15{,}000 - 75p$ relating number of tickets that would be sold to the ticket price.

   a. Income from ticket sales is found by multiplying the number of tickets sold by the price of each ticket. The rule $I = p(15{,}000 - 75p)$ shows how *income* depends on *ticket price*.

   i. What do the terms p and $(15{,}000 - 75p)$ each tell about how ticket price affects the concert business? [2 pts]

   ii. Why does the product give income as a function of ticket price? [2 pts]

   b. What ticket price(s) is likely to produce concert income of at least $550,000? *Show your work.* [2 pts]

   c. What is the predicted concert income if the ticket price is set at $30? *Show your work.* [2 pts]

   d. What ticket price is likely to lead to the greatest concert income? *Show your work or Explain your thinking.* [2 pts]

   e. What ticket price(s) will lead to 0 income? *Show your work or Explain your thinking.* [2 pts]

   f. Sketch a graph of the relationship between concert income and ticket price. Then label the points with the coordinates that provide answers to Parts b, c, d, and e. [4 pts]